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ABSTRACT

The thesis of this paper is that efficient functioning of a network is dependent upon the organization of bibliographic services so that the basic record for each bibliographic item is created once. This record must be minimally capable of serving the needs of libraries, information centers, abstracting and indexing services, and national and trade bibliographies. What is proposed is a centralized National Bibliographic Service (NBS) composed of component institutions functioning as a unified whole. The authors assume the existence of a national network, with appropriate telecommunications. The intent is to demostrate the need for a centrally processed bibliographic record, to consider standardization requirements for such a record, and to point up the results of failing to provide this record. (Other papers from this conference are available as LI 003360 - 003365 and LI 003367 through LI 003390) (Author/NH)

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BIBLIOGRAPHIC SERVICES FOR A NATIONAL NETWORK

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INTRODUCTION

Networks may be characterized by the kind of nodes connected, by the information going over the network, and by the type of communication facilities employed. Thus we may discuss a library network, with theoretically only libraries as nodes; an interlibrary loan network, where requests for materials are interchanged among unspecified nodes, and a microwave network, in which case only the carrier is emphasized but neither the "message" nor the nodes are specified. For any specific information network, however, an explicit assignment must be made of: 1) the operational nodes, 2) the data flowing through the network, and 3) the facilities to be used.

While information networks will certainly exchange other than bibliographic data, we may assume, in the context of this Conference on Interlibrary Communications and Information Networks, that we are chiefly concerned with the interchange of bibliographic references. Text, abstracts, and non-bibliographic reference questions and answers will be transmitted but these transactions will usually include a bibliographic reference. Much of the traffic through an information network will consist of requests (in the form of a bibliographic reference) for location and loan or copy of a bibliographic item, or for citations on a particular subject.

Rather than postulate the information network ir its entirety, we have chosen to concentrate on what we consider to be the foundation of this network, the provision of a standard bibliographic record which will accommodate network transactions. The thesis of

this paper is that efficient functioning of a network is dependent upon the organization of bibliographic services so that the basic record for each bibliographic item is created once. This record must be minimally capable of serving the needs of libraries, information centers, abstracting and indexing services, and national and trade bibliographies. What is proposed is a centralized National Bibliographic Service (NBS) composed of component institutions functioning as a unified whole.

The authors assume the existence of a national network, with appropriate telecommunications. They do not hypothesize: 1) the structure or the communications facilities of the network, 2) the details of organization and funding of the NBS, 3) the mechanics of providing holdings information for a system of union catalogs, 4) the methodology of publication of bibliographic services, or 5) the cost estimates of services proposed. The intent is to demonstrate the need for a centrally processed bibliographic record, to consider standardization requirements for such a record, and to point up the results of failing to provide this record.

VARIETIES OF BIBLIOGRAPHIC SERVICES

The current complex pattern of bibliographic services consists of a multiplicity of organizations issuing a variety of products. These products vary significantly, depending largely on the uses to be made of them, and reflect the individual requirements of the producers.

It is these "uses" and "requirements" that create one of the fundamental problems in our current attempts to control information. Although the goal of all services is to provide bibliographic

information to a user, there are dissimilarities in the principal functions of the agencies involved. Differences in importance given to and treatment of the form and function of elements of the bibliographic record are dependent on the function of the service.

We may characterize certain types of bibliographic services and their functions as follows:

Library catalogs serve to index an individual collection by author, title, subject, and series. To enable the user to find a physical volume, rather than merely a bibliographic reference, the catalog also provides a location code, or shelf number. A unique form of entry for each name or topical heading used as an access point is maintained by means of authority files. The Library of Congress (LC) name and subject authority files are frequently the de facto authority by virtue of the wide use of LC catalog data. For economic reasons (e.g. filing time, size of catalog) the number of access points is often limited in number. The various access points serve o bring together works by the same author, works with the same title, and works on the same subject. A unique bibliographic description of each item makes it possible to distinguish between different works with the same title and different editions of the same work. The libra catalog, for the most part, is designed to index works as a whole, in contrast to published services which index the contents or parts of composite works, the articles in a journal, or the individual issues of a series.

Union catalogs serve to consolidate location information for library materials within a cooperating group of libraries. Since the catalog does not represent a single library, but combined catalog

entries for several libraries, the various entries are related to each other only incidentally. Apparently identical items are usually merged into a single entry with appropriate location codes, and disparate entries for apparently identical authors may be made uniform. For economic reasons, access is generally limited to main entry. Certainly multiple access points would enhance the location function of union catalogs.

National bibliographies provide an official record of those items published within a country during a given period of time. By virtue of this time orientation, national bibliographies serve as an awareness service and may also be used as a source of catalog data. They are not themselves catalogs, however, since they are not based on nor limited to any single collection or group of collections. More significantly, because there need be no carry-over from the past, they are not subject to the problems of consistency of entry and description which beset the maintenance of library catalogs.

Trade bibliographies function principally as an awareness service for those publications available through the booktrade. While current announcement services are concerned only with a specified time period, true trade bibliographies are a composite list of all titles in print. While name entries are generally taken directly from the publication, subject entries require updating. Most trade bibliographies contain only the brief information necessary for ordering. Certain announcement services, however, provide essentially complete LC catalog records which serve as a source of catalog data for many libraries.

Abstracting and indexing services are concerned with indexing technical report literature and individual articles from journals and composite works. Because these services generally index more specialized materials and are aimed at the specialist in a particular discipline, in-depth indexing by means of a relatively large number of very specific subject terms is the rule.

The tailoring of abstracting and indexing services to a particular clientele or discipline often results in duplication of indexing for the same item in several services, since disciplines are often interrelated.

It was the recognition of the different characteristics and functions of the bibliographic services that prompted the research by the American National Standards Institute (ANSI) Z39 Subcommittee 2 (Z39.SC2) in 1967. [5/] The study was designed to assist the subcommittee in determining what units of information should be identified in machine-readable bibliographic records. The investigators attempted tc identify the elements of bibliographic description of various forms of material and the uses made of the records. The difficulties encountered were many. The subcommittee concluded that the most useful next step would be to draft a format structure which would establish a mediu of exchange between various producers and users of information. There would be no attempt to specify data elements to be identified, this being left to the discretion of the user. This effort resulted in a standard format for bibliographic information interchange on magnetic tape. Hindsight indicates that the subcommittee should

have extended its efforts and continued work toward standardization of the content of records and the content designators. [1]

An unpublished study performed by Inforonics, Inc. for the Library of Congress in 1969 gave further evidence of the problems of incompatibility due, in part, to functional differences. The purpose of the study was to determine the feasibility of producing a "universe of legends" [2] for bibliographic data. The investigators analyzed machine-form bibliographic records for differences in the content and content designators, and the reasons for the differences.

The results clearly indicated that distinctions in bibliographic form (book, serial, etc.) alone do not determine the content or content designators of machine records, but that agreement on standards for machine-readable formats are reached chiefly by those who share common bibliographic practices and who make the same uses of the data bases they create.

The non-uniformity is clearly evident in comparing the bibliographic records of large research libraries and information centers. Without engaging in an evaluation of the merits of one system, or the effects of following any one set of conventions as opposed to the other, it is sufficient to say that the cumulative consequences of these disparities is costly duplication of producing records for

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[1] Content designators are tags, indicators, and subfield codes employed to explicitly identify or characterize information.

[2] A legend is a code in the record that identifies the content of the record, i.e., the form of material being described, the data elements included and the content designators used. The legends bring all ANSI format records into a common frame of reference.

the same item and minimization of the users facility to tap all services as an integrated system.

That bibliographic services have individual functions which differ is not contested. It is the apparent non-recognition of the urgent necessity for agreement on standards for the identification, representation, and recording of bibliographic and textual data elements which is questioned.

MACHINE-READABLE BIBLIOGRAPHIC SERVICES

Since this article is concerned with bibliographic data services in a network context, it seemed appropriate to examine some of the machine-readable transfer systems that exist today. The aim was to investigate a sufficient number of the systems to arrive at conclusions regarding the state of the art in relation to network services. Bibliographic services for a national network, in an environment using the computer and associated communication and peripheral devices as tools, demand the transmission of machine-readable data.

A considerable number of magnetic tape services are now available and many problems exist.

Both 7- and 9- level tapes are issued. Within each type, a variety of codes are used for the representation of the character set of the producer. In addition to the code variations, tape densitie (number of characters per inch recorded on tape) are not standardized.

The structure of the bibliographic record on magnetic tape varies from service to service, as does the degree to which data

elements of the record are explicitly identified and the method of identification. For example, names may be identified as personal and corporate, or only as names. In some instances all names are recorded in a single field separated only by a unique character. In other systems names are characterized by their function, e.g., main entry or subject. The same data element may be explicitly identified in two or more systems, but the content designators used to identify the element may be different. Finally, the content of the bibliographic description and the choice and form of access points to that description, e.g., name and subject entries, are often inconsistent.

In summary, the results of this investigation support all prior conclusions as to lack of standardization with one significant exception, i.e., the adoption of the ANSI format as the interchange format by several agencies with operating systems and planned future systems. LC's MARC (MAchine-Readable Cataloging) Distribution Service, the Federal Clearinghouse for Scientific and Technical Information system, the International Nuclear Information System (INIS), and the British National Bibliography (BNB) MARC system are among those utilizing the ANSI standard. The Federal Clearinghouse is one of the many U.S. Government agency members of the Committee on Scientific and Technical Information (COSATI) that have adopted this format.

All members of COSATI are in agreement on the content and content designators of the record. The Library of Congress and the British National Bibliography have arrived at almost complete agreement concerning their machine-readable records. The few dissimilarities in content designation that remain again point out the differences in

the functions of a library as compared to those of a national bibliography. Some of the variations in the form of content reflect lack of uniformity between the North American and British editions of the Anglo-American Cataloging Rules (AACR). [2,1/] Other variations stem from the LC "superimposition" policy as contrasted with the complete adoption of the AACR by BNB.

However, little similarity exists in the data elements or the content designators when comparing the formats of either COSATI or INIS with LC and BNB. INIS, like COSATI, principally interested in technical reports, has nevertheless defined different data elements and content designators. It is unfortunate that closer cooperation did not exist between the two systems to insure compatibility where possible. The Library of Congress, in its MARC system, has defined formats for books, serials, maps, manuscripts, and motion pictures and filmstrips. The correlation of content designators across all forms of material has been an essential part of all design work.

RECOMMENDATIONS FOR A NATIONAL BIBLIOGRAPHIC SERVICE

We may characterize the objectives of bibliographic service as follows: 1) the citation of a bibliographic item for the purpose of establishing its existence, 2) the location of an item,and 3) distribution of a record of the bibliographic item for local use.

Summarizing the present "non-system" of services, there is no pattern by which the various pieces fit into a comprehensive whole. Lack of agreement on name and subject entries and elements of description make identification of different records as belonging to

the same bibliographic item often difficult or impossible. Machine-readable services are incompatible in their identification of elements of the record and in the structure of the record. Thus it becomes imperative to begin thinking of an NBS which would assume comprehensiveness, and avoid unnecessary duplication in the creation of the bibliographic record. This national service would act as an agency to promote standards, correlate the basic objectives of identification, location, and distribution, and coordinate the variety of bibliographic agencies which should be a part of the national bibliographic picture.

It is indicative of the trend toward centralization through a national bibliographic service to note the recommendations made in the report of the British National Library Committee [8], the report on An Integrated Information System for the National Library of Canada, [12] as well as the efforts over the past decade to develop a plan for a national information network summarized in a report by the Library of Congress. [15] The LC article characterizes the plans as stemming from those elements of the Federal Government concerned with science and technology and having as their principal aim the reduction in the bulk of the accretion of scientific and technological literature through physical means, e.g., microforms and electronic processing, or intellectual means, e.g., abstracting, evaluation, and analysis. This report further points out that reduction in the physical bulk of materials does not achieve a reduction in the number of units that must be handled and controlled in the library and information systems, but on the contrary, each surrogate becomes a new, additional information item.

The authors support the views expressed in the report that information is a continuum that cannot be readily fragmented into distinct and non-overlapping fields, that a national network should not be implemented for science and technology alone,nor among information centers excluding libraries, and that the Library of Congress already stands at the focus of a large national information network.

To quote the opinion of the Library on the fundamental requirement for success in establishing an effective national information network: "The basic need is to develop a responsive, flexible, communications medium that will serve as the means for moving the information record throughout the system. Solution of the communications problem is more important than administration, or organizational structure, or areas of responsibility for subject coverage or for handling categories of documents. The network problem is an access problem, and the access problem is essentially a file problem. It is a problem, therefore, of what librarians, in their old-fashioned terminology, call bibliographic control--control of the record surrogate for the actual informational piece, the original informational package. For the ultimate national network, which of course must be envisioned as an automated system with fast response time, even real time capability, there is, then, an overriding need to develop a standard record with a full range of appropriate codes, as the 'lingua franca' of the entire system. The standard record should be modular in format, open ended, multipurpose, highly manipulable, and responsive to the need for a wide variety of products and services that the system must be capable of providing."[1]

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1 15/, p. 440-441.

The LC statement was made in response to a request by the Chairman of the National Advisory Commission on Libraries to the Librarian of Congress to express the Library's views on its role as the national library of the United States.

Building on present LC services, the bibliographic record for all documents published in the United States should be produced within the unified environment of an NBS. The above statement does not imply that the intellectual analysis required for the entire content of the record is the responsibility of one institution. What is implied is that several agencies operate in unison.

Prompt one-time creation of a bibliographic record and adequate provision of its dissemination to all users would benefit both the producer of secondary services and the ultimate user.

PROGRESS TOWARD A NATIONAL BIBLIOGRAPHIC SERVICE

Several programs undertaken during the past few years by the Library of Congress support the concept of an NBS.

Shared Cataloging

Under Title II C of the Higher Education Act of 1965, the Library was charged "with (1) acquiring so far as possible, all library materials currently published throughout the world which are of value to scholarship; and (2) providing the catalog information for these materials promptly after receipt..."[1] The Shared Cataloging Division of LC was organized in 1966 to handle the cataloging workload. Whereever available, descriptive cataloging of the national bibliography is used, with modifications of entry when

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[1] 6/, p. 92

necessary, and with the addition of subject headings and classification. Depository sets of cards are distributed to participating libraries. Copies of orders for foreign titles not found in the depository catalog are sent to the Library so that the publication may be acquired and cataloged. Thus, in principle, the Library already has the authority to be the centralized cataloging agency for the nation.

MARC

The MARC Distribution Service grew out of a pilot project to test the feasibility of centrally producing and distributing machine-readable catalog records.[19/] From the First Conference on Machine-Readable Catalog Copy in 1964, attended by representatives of the Library of Congress, universities, research agencies, Government agencies and private industry, the consensus of opinion was that early availability of machine-readable catalog copy as a by-product of LC's cataloging operations would be desirable. Since the record would be used for a variety of purposes in many libraries, agreement on data elements to be encoded was desirable and the design of a machine-readable record by the Library was probably the best means of standardization.

The pilot project resulted in: 1) a standard interchange format (ANSI standard), 2) the definition of standard records for several forms of material, and 3) the inception of the MARC Distribution Service beginning with the provision of English language catalog records in March 1969. Expansion to other languages and other forms of material is planned for the future. While implementation of systems for the

utilization of MARC has been slow, no one has suggested that the MARC Distribution Service (or the Card Division Distribution Service) be abandoned in favor of decentralized production of catalog records by many institutions.

RECON

With a MARC format accepted widely by the library profession, libraries throughout the country began to discuss and plan conversion of their retrospective catalog records to machine-readable form. Uncoordinated projects were certain to differ with respect to completeness and uniformity and, in addition, would result in duplication of conversion of the same items. Such efforts are not only economically unsound but threaten the future of a national machine-readable data base of bibliographic information. The Council on Library Resources granted funds to the Library of Congress for a study to determine the feasibility of centralized conversion of retrospective catalog records and their distribution to the entire library community. The RECON (REtrospective CONversion) Working Task Force, [13/] which was assigned direct responsibility for the study, recommended that large scale conversion should be a centralized project, under the direction of the Library of Congress, that standards for conversion of retrospective records should be the same as those for current records, and that a pilot project should be undertaken to test empirically what had been hypothesized in the study.

The RECON Project was initiated in August 1969. Along with converting approximately 85,000 1968 and 1969 English language monograph titles, a group of research titles will be selected to test the

various conversion techniques for older and non-English titles. Format recognition algorithms[1] are being developed and the state of the art of input devices monitored. In addition, the RECON Working Task Force was reconvened to study four tasks of national scope.[4/] Significant to this discussion are the findings of Task 1 and Task 3.

Task 1 concerned the feasibility of standardizing a level or subset of the MARC II format which would allow a library to input less complex records than LC/MARC but would still permit the library to contribute to a future national data base. A level is defined as: 1) the bibliographic completeness of a record, and 2) the extent to which its contents are explicitly identified for computer manipulation. The study[14/] concluded that there are two functions of a national data base: 1) the distribution function, and 2) the National Union Catalog function. Further, it concluded that "The distribution function can best be satisfied by a detailed record in a communications format from which an individual library can extract the subset of data useful in its application, to satisfy the needs of diverse installations and applications, records for general distribution should be in the full MARC II format."[2] This supports the concept that all records needed for distribution purposes are best prepared at a central source.

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[1] Format recognition is a technique that examines data strings for keywords, significant punctuation and other cues in order to assign content designators to the data elements of a bibliographic record. The process will shift some of the burden of editing from the human to th machine and should result in a cost savings in the conversion of bibliographic records to machine-readable form. 18/

[2] 14/, p. 124, 126.

Task 3 resulted from the awareness of a large number of machine-readable bibliographic records generated through automation projects at individual institutions. The RECON Working Task Force considered it important to explore the feasibility (bibliographic, technical, and economic) of utilizing existing records as part of a national bibliographic service. Requiring investigation was the possiblity and associated problems of: 1) comparing records with the MARC/RECON data base and identifying records already in machine-readable form, 2) augmenting records not in MARC/RECON to bring them up to the level of completeness of a MARC II record, 3) changing entries for records not in MARC/RECON to be consistent with entries in the LC Official Catalog, and 4) translating those records not in MARC/RECON into the MARC II format. The first phase of the task was a survey and analysis of existing data bases in machine-readable form. Forty-two libraries, a representative sample of different types of systems, were contacted; 33 responded. The study is still underway and a complete report of findings will be made at a later date. However, within the context of this paper, it is worthwhile to point out that the survey showed that approximately 3 million records are already in machine-readable form in 33 libraries in this country alone. Of this total, 2.5 million are monograph records. The preliminary analysis performed up to this time indicates that the bibliographic conformity across data bases is virtually non-existent. Considering the resources expended to create the existing data bases, the resultant duplication of titles and the non-uniformity of the machine-readable records, it is urgent to take action.

With the Library of Congress' past history of bibliographic services, it seems desirable, in our view, that the Library assume the duties of the NBS. It should again be emphasized that this does not necessarily exclude other organizations from contributing to the NBS. It does place the main responsibility for NBS on the Library and in so doing might result in significant changes in the course of reorganizing LC bibliographic services into an NBS.

In order to create records appropriate to a national service, the Library might close off its Official Catalog to achieve greater uniformity in the application of the Anglo-American Cataloging Rules (the policy of "superimposition" was adopted by the Library in lieu of changing existing entries to conform with AACR) and to make changes in its subject heading system. In this case, libraries using the products of an NBS based on LC cataloging might have to consider closing off their own catalogs to avoid making costly changes. Although the closing of the catalogs would not resolve all problems associated with relating new entries to past records, or making variations in LC records to conform with cataloging done locally to expedite the processing of material, it could have the effect of having the entire library community follow one set of rules and could have impact for the future.

CONSIDERATIONS FOR NATIONAL BIBLIOGRAPHIC SERVICE STANDARDS

The availability from the NBS of records with a standard identification number, a standard bibliographic description, standard rules for entry, greater uniformity in subject analysis, and a standard machine-readable record for each form of material, would enable network

members to devote a much larger share of their resources to satisfying the needs of their particular clientele. In some instances, standards are already in being; in others, work has just begun. Standards range in complexity from relatively simple to extremely difficult to attain. They result from the perseverance of experienced individuals to "endure" through the democratic review process and the constant revisions while the proposal is eventually transformed to satisfy the majority. Wigington and Wood[1] state: "As the expression of the major significant details in information-transfer system design, standards of representation and practice, agreed to and used by all parties, become the guiding mechanisms which replace unified management. As such they take on an importance in achieving progress in national, and international information transfer which is beyond the technical importance normally associated with standards. All parties, however, must be patient with the inevitably slow development and utilization of those standards."

Standard Identification Number

Agencies responsible for the assignment of the Standard Serial Number (SSN) and standard numbers for non-book materials must be designated, as has already been done for the Standard Book Number (SBN). In Great Britain total book numbering is almost an accomplished fact. The Standard Book Numbering Agency in New York reports a high degree of success in implementing the SBN in this country.

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[1] 20/, p. 444.

The International Standards Organization (ISO) has recently adopted an international numbering system making the SBN an ISBN.[10/] An ANSI Z39 Subcommittee is charged with developing an SSN.

Standard Bibliographic Description

A Standard Bibliographic Description (SBD) is being developed by the International Meeting of Cataloging Experts (IMCE) Working Group of the International Federation of Library Associations (IFLA). "The primary purpose of the SBD is to act as a standard for the making of the descriptive part of the definitive national record of a book... A second purpose of the SBD is to provide a formula to serve as a basis for entries in catalogues, lists, and bibliographies other than the national bibliography."[1] The SBD will consist of a set of recommended elements, a fixed order for their presentation, and a standard system for punctuation. Thus, it would be possible for people to recognize the elements forming part of the bibliographic description, regardless of the language. Catalog records constructed according to the SBD will materially assist the conversion of these records into machine-readable form.

Standard Rules for Entry and Descriptive Cataloging

International agreement on entry and description should be reached so that the content of national bibliographic records from different countries will be uniform. Rules for cataloging scientific and technical reports and monographs should be consistent. Progress

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[1] 9/, [p. 2]

in this direction is being made. North,[11] in comparing the AACR and the COSATI Standard for Descriptive Cataloging of Government Scientific and Technical Reports[7] report that they are more in harmony than the ALA and DDC standards they replace. If libraries and other bibliographic services are to be able to integrate monographs and report literature into one system, further steps in this direction are necessary.

Standard Approaches to Subject Analysis

Across-the-board agreement on standard approaches to subject analysis of library materials would be highly desirable but admittedly difficult (if not impossible) to obtain. The vantage point for subject analysis is in the eye of the beholder and this bias, in turn, is reflected in the structure and content of various classification systems and indexing vocabularies. Even an optimum general approach cannot be expected to satisfy the requirements of all special agencies. Thus the most reasonable hope is for the NBS to provide classification numbers that will be acceptable for most general library purposes. Acceptability can be fostered by providing alternative classification numbers when possible.

Efforts should be made also to achieve the greatest possible compatibility and convertibility among major indexing vocabularies. This is no minor task, however. A working group of the U.S. National Libraries Task Force on Automation and Other Cooperative Activities has been making some progress toward the reconciliation of the subject heading lists of the three national libraries but differences in scope and services of the three collections place formidable problems in the way of development of a single list. The NBS should by its nature make

use of an indexing vocabulary that has wide acceptance.

In all of these efforts, consideration should be given to the suitability of specific subject control devices for computer processing. Too little is known about optimum machine searching techniques to assert that a given form of indexing vocabulary is best for this purpose. This problem should be thoroughly investigated without losing sight, however, of the fact that indexing terms will almost certainly have to be displayed in conventional ways for many years to come.

Standard Interchange Format for Machine-Readable Data

The adoption of the ANSI format as the proposed ISO format is encouraging. However, progress made toward the use of a standard interchange format structure does not imply agreement on the content or content designators. For an NBS to be most effective and economical to both the producer and user, the data elements and their identification must be coordinated.

CONSIDERATIONS FOR NATIONAL BIBLIOGRAPHIC SERVICE COMPONENTS

The national responsibility for the NBS must be clearly established along with a mechanism that would regularly provide the NBS with advice and guidance from the library and information community. Federal funding will be required, and states might also share in the cost. Services could be sold by subscription. The relationship of the NBS and the book trade, information centers, and organizations responsible for the production of abstracting and indexing services or other bibliographic services must be defined.

Although not formally described as components of an NBS, there is evidence of a trend in this direction.

The Standard Book Numbering Agency, New York, is a collaboration between the American Book Publishers Council, American Educational Publishers Institute, American National Standards Institute Committee Z39, Library of Congress and R. R. Bowker Company, and includes the U. S. and Canada. NBS component agencies will need to take the responsibility for referring to the SBN agency any items for which no number has been provided by the publisher.

There is a renewal of interest in Cataloging-in-Publication, formerly termed Cataloging-in-Source. Under the proposed plan, the publishers would submit galley proof to the Library of Congress for assignment of main and added author entries, short title, imprint, subject headings and classification numbers. This information would be input to an incomplete MARC record, and a hard copy of the record returned with the galley proof to the publisher for printing in the book (imprint would not appear in the hard copy record for the book). If this program can be successfully implemented and extended to the majority of publishers, an official MARC record could be used to produce trade bibliographies, including advance lists. The records would be available to libraries for ordering and for preparation of processing materials in advance of receipt of the book. Timeliness of the bibliographic record will be essential for all segments of the network.

In Great Britain, Whitaker produces the trade bibliography record in a MARC format intended to be used as a temporary record until

it is replaced by a full MARC record from BNB. Whitaker also assigns the SBN to those titles furnished to it by BNB which have not had the SBN assigned by the publisher.

It is essential that the abstracting and indexing agencies be integrated into the NBS. The producers of these services--which include the two national libraries, specialized government information centers, scientific and technical societies, and commercial services--could create the standard bibliographic record for all materials within their subject area and publish the abstracting and indexing service for that body of information.

Foreign literature, cataloged by a national bibliography according to standard procedures, would be assigned to the appropriate NBS agency to coordinate names used for entry, convert subject terms, and assign a classification number.

The goal of comprehensive coverage of state and local documents might be best served by assigning the responsibility for cataloging these to the fifty state libraries, with each state responsible for the corporate authority file of its state and local agencies.

The resulting record for either U.S. or foreign publications will become part of the national data base, for distribution to subscribers,for use in the creation of a national bibliography, national or regional union catalogs, lists of new serial titles, abstracting and indexing services, periodical indexes, current awareness services, etc.

The national data base might, in fact, be a series of specialized data bases, with a central switching service to permit switching of queries to the appropriate data base. One of the data bases could

be the LC name authority records, which is maintained by the Library of Congress and might be shared by those agencies with the responsibility for cataloging certain portions of the literature.

One of the major differences in existing cataloging conventions is in the use of established forms of names. Libraries enter works under the established form of both corporate and personal name. The scientific and technical community and many abstracting and indexing services tend toward establishing corporate names but,in most instances, use personal names as they appear on the piece. If a single name authority file could be shared among all producers and each bibliographic record contained both the established form of name and the name as it appeared on the published item, a connecting link would be established. Thus, access could be provided to all works to which a particular person was related. Such a system would increase the serviceability of a bibliographic file to the user.

The above implies more effort in the creation of each record. For the literature of the scientific and technical community and abstracting and indexing services, names would have to be established; for traditional library materials, names as they appear on the piece would have to be included. (The IMCE Working Group for the SBD is recommending that the personal name author statement always be included in the body of the description.) The savings would be in the creation of only one record.

However, the inclusion of the established name and the name as it appears on the piece in each record does not offer a Utopian solution. In many instances, if one approaches the file with the

author's name as it appears on the piece to determine all works by that author, the result may be all works by many authors. For example, J. Brown will be linked to John Brown as well as to James Brown. In addition, new names cannot be established in isolation; they must be established in relation to a single comprehensive authority file to insure that all of them will meet the same criteria of individuality.

NETWORK SERVICES PROVIDED BY THE NBS

Assuming the existence of a national network, how would the NBS serve the users of this network better than they are served today?

Selection

At present, the selection function is accomplished by using a variety of alerting services published in different formats. With a Cataloging-in-Publication record available at an early date, and an ISBN and/or LC card number to facilitate identification, announcement services could reference reviews, and both could be indexed by classification and subject headings as well as author and title. Such a service would also aid the vendors and users of approval services.

Selection in a network context also implies the ability to determine what need not be purchased by the individual organization if it is available through the network when needed. For this it is necessary to determine what is on order in cooperating agencies,as well as what already exists in their collections. The likelihood of being able to identify orders for the same item by different institutions as being in fact the same item is greatly enhanced by the early existence of a uniform record and the ISBN.

Location

Location of materials for purposes of requesting a loan is fraught with problems in the present system. Communications may speed the process of querying, but cannot solve the problem of identification. Examples of conflicting reports submitted to the National Union Catalog (NUC) are cited in the RECON report. 12/

With some imagination and luck, one may locate a name entry in the NUC, since names are matched with LC established forms and added entries and references are included. Working with local or regional union catalogs is much more hazardous, since these are often single entry catalogs, the base for coordination is smaller,and less effort and expertise at matching may be contributed.

Efforts to locate materials by subject are even less successful, since only titles cataloged by the Library of Congress are indexed in Library of Congress Catalogs -- Books: Subjects 16/, and most local and regional catalogs do not include a subject index. Access by title is almost nonexistent.

Clearly there is a need for national, regional, and state union catalogs accessible by author, title, and subject (including series). Unless there are uniform entries, produced from a single source, there will be great waste in terms of effort and funds, and also great inefficiency and confusion as one switches from searching local catalogs to searching state, regional and national union catalogs.

The conversion of the LC retrospective catalog is urgently needed if existing collections of libraries are to be made maximally accessible within a network. There will still remain the problem of

disparate entries for titles not in the Library of Congress, but adoption of the RECON record by all libraries as they contribute their holdings information to the NBS would be a giant step toward solving the problem.

The pattern of location files in a national network will be dependent upon the organization and communications pattern of the network, and are immaterial to this discussion. Conceivably the NUC might list all titles in the national data base under multiple entries, but give only the regions in which the work is held. Specific locations holding the title could then be ascertained from a machine-readable file at the regional headquarters. Many variations are possible. What is important is that access points, bibliographic description, and identification numbers of the national, regional, and local records be alike. Ultimately, with coordinated bibliographic description and location services, a user should be able to proceed from finding a citation in an index, to calling up an abstract or a critical review, to determining the most accessible location of the item and the current status of that item, and finally to requesting a loan of the material.

Cataloging

The benefits of a standard bibliographic record for cataloging have been mentioned throughout this paper. To summarize, this record would be uniform, authoritative, multi-purpose, and cover essentially all library materials. In addition, more name and subject approaches would be provided to aid the user, given a national network and economically feasible telecommunications facilities, a variety of improved methods of distribution of catalog data could be implemented

Direct telecommunications transactions between all libraries and the central NBS for the acquisition of catalog records would not appear to be feasible. Depending upon the organization of the network,regional or state centers might service the cataloging requirements of member libraries as well as maintain the location records for materials within their area. Avram [3/] describes a hypothetical network for sharing catalog data in which major regional centers maintain the union catalog for their area and also serve as distribution centers for particular segments of the national data base. The regional center would receive all currently produced records from the national center, but after a stated interval, retain only those records used within its region or pertinent to its national responsibility.

Libraries within the region would report holdings and request machine-readable catalog data or possibly contain catalog products. Depending upon the size and population of the region, state centers may well act as an intermediate level between the regional center and the individual library. In this case, holdings and requests would be reported through the state center. It in turn, would supply those records already within the state system, report the holdings to the regional centers, and supply the catalog products required by the individual library. It might also maintain a statewide system of union catalogs. The regional union catalog might be in machine-accessible form only or might include only certain locations.

Remote access to the state or regional data base will likely be utilized by some, but not necessarily all libraries. At some point

in time, the regional data base may conceivably be queried directly by some libraries in lieu of maintaining individual library catalogs.

Processing materials may be produced at the state level, or libraries could contract for cooperative or commercial processing or catalog production services and achieve the same catalog data, while only reporting holdings to the network.

Whatever the organization of the network,and the mix of services utilized by libraries and other organizations, the result of the NBS standard record will be a degree of consistency and compatibility that is impossible today. In fact, the proliferation of commercial and cooperative services and of individual automated library systems--each using a different catalog record--will make it more and more difficult to implement a network as time goes on.

OUTLOOK

We are now reaching a time when the discussion of information networks at the conceptual level is generally re-treading old ground. Crystal balls should be broken. Further consideration of networks of the far future may be of intellectual interest but offer little to move us ahead. Experience has also shown that results are inadequate where no implementation is begun until research and development has defined the minutest specifications of the design of the total system. This approach fails for large complex systems for two reasons. First, man is unable to comprehend such great complexity. Second, rapidly advancing technology causes technical components to become obsolete during the long period of the total design effort. It is, therefore, imperative that we begin to search for practical means of implementatior

at the earliest date. The prerequisites seem to be 1) design of one operational nodule at a time, 2) each nodule must be based on operational experience gained from the preceding phase, and 3) a recognition of some ambiguity in total systems comprehension from the beginning. If this approach is accepted, then the people involved must recognize the need to constantly revise specifications.

In the final analysis, the time eventually comes when we must face the hard question of how to begin.

Although computers are able to process information more efficiently than humans, and telecommunication links are able to make information more rapidly available, it does not necessarily follow that operational large-scale network systems are soon within our grasp.

Our communications link is the common language of bibliographic description, whether the representation of this description is in printed or digital form. Unless we succeed in implementing a national center to coordinate the processing and distribution of standard bibliographic records for multiple uses, networking in our sense will indeed be a fairy tale.

BIBLIOGRAPHY

1. Anglo-American Cataloging Rules. Prepared by the American Library Association, the Library of Congress, the Library Association, and the Canadian Library Association. British Text. London, Library Association, 1967. 327 p.

2. Anglo-American Cataloging Rules. Prepared by the American Library Association, the Library of Congress, the Library Association, and the Canadian Library Association. North American Text. Chicago, ALA, 1967. 400 p.

3. Avram, Henriette D. "Bibliographic and Technical Problems in Implementing a National Library Network." Library Trends, 18:487-502, April 1970.

4. Avram, Henriette D. "The RECON Pilot Project: a Progress Report." Journal of Library Automation, 3:102-114, June 1970.

5. Curran, Ann T., and Henriette D. Avram. The Identification of Data Elements in Bibliographic Records; Final Report of the Special Project on Data Elements for the Subcommittee on Machine Input Records (SC-2) of the Sectional Committee on Library Work and Documentation (Z39) of the United States of America Standards Institute. Needham, Mass., 1967. Various pagings.

6. Dawson, John M. "The Library of Congress: Its Role in Cooperative and Centralized Cataloging." Library Trends, 16:85-96, July 1967.

7. Federal Council for Science and Technology. Committee on Scientific and Technical Information. Standards for Descriptive Cataloging of Government Scientific and Technical Reports. Revision no. 1. Washington, D.C., Clearinghous for Federal Scientific an Technical Information, October 1966. 50 p. (AD641 092).

8. Gt. Brit. National Libraries Committee. Report of the National Libraries Committee. Chairman: F.S. Dainton. London, Her Majesty' Stationery Office, 1969. 320 p.

9. International Meeting of Cataloguing Experts. Working Group on the International Standard Bibliographic Description. Standard Bibliographic Description (for Single Volume and Multi-Volume Monographs)... prepared ... by Michael German. July 1970. Unpaged.

10. Koltay, Emery. "International Standard Book Numbering." In Bowker Annual of Library and Book Trades Information, 1970, R. R. Bowker, 1970. p. 71-74.

11. North, Jeanne B. "A Look at the New COSATI Standard." Special Libraries, 58:582-584, October 1969.

12. Ottawa. National Library. An Integrated Information System for the National Library of Canada. Report of the System Development Project. Vol. 1, The Report. Ottawa, Bureau of Management and Consulting Services, Department of Supply and Services, June 1970. 210 p.

13. RECON Working Task Force. Conversion of Retrospective Catalog Records to Machine-Readable Form. Washington, D. C., Library of Congress, 1969. 230 p.

14. RECON Working Task Force. "Levels of Machine-Readable Records." Journal of Library Automation, 3:122-127, June 1970.

15. U.S. Library of Congress. "The Library of Congress as the National Library: Potentialities for Service." In Libraries at Large: Tradition, Innovation, and the National Interest. Edited by Douglas M. Knight and E. Shepley Nourse. New York, R.R. Bowker Company, 1969. p. 435-465.

16. U. S. Library of Congress. Library of Congress Catalogs--Books: Subjects. Washington, D. C. Quarterly.

17. U.S. Library of Congress. Library of Congress Catalogs--Complete. The National Union Catalog. Washington. Monthly.

18. U.S. Library of Congress. Information Systems Office. Format Recognition Process for MARC Records: a Logical Design. To be published by the American Library Association.

19. U.S. Library of Congress. Information Systems Office. The MARC Pilot Project; Final Report... Prepared by Henriette D. Avram. Washington, Library of Congress, 1968.

20. Wigington, Ronald L. and James L. Wood. "Standardization Requirements of a National Program for Information Transfer." Library Trends, 18:432-447, April 1970.